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VLAHOS, SOPHIA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/689,275	Applicant(s) ROBINSON ET AL.	
	Examiner SOPHIA VLAHOS	Art Unit 2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 30 August 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,5-19 and 21-26 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,5-19 and 21-26 is/are rejected.

7)☒ Claim(s) 17 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 20 October 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's argument (8/30/2007) that "Swanke and Haas, taken alone or in combination, fail to teach or suggest all of the elements of claim 1.Neither Swanke nor Haas, taken alone or in combination, teach combining a DS-SS signal and a FH-SS signal to provide a spreading signal." is persuasive. However Applicant's arguments with respect to claims 1, 5-6, 10-12, 19 and 21 are moot in view of the new ground(s) of rejection.

Addressing the rejection of claims 13 and 26 Applicant's argues (8/30/2007 page 8): "The Office Action notes that Swanke does not teach the recited clipping component, and relies on Panasik to provide a clipping component implemented upstream of an analog-to-digital converter. According to the Office Action, one skilled in the art would be motivated to include the clipping component to limit the dynamic range of the signal to an associated dynamic range of the analog-to-digital converter. It is respectfully submitted, however, that one skilled in the art would not seek to clip a spread signal for this purpose as the spreading of the signal already provides a decrease in the dynamic range of the signal at the expense of an increase in bandwidth. See Specification at ¶0031. The further addition of a clipping element would be redundant and introduce addition error, as clipping introduces nonlinearities into the signal. Accordingly, one skilled in the art would not seek to utilize clipping with a spread signal, as is evidenced by the fact that the references dealing with a spread signal." Examiner disagrees with Applicant that there is no motivation to clip (as part of the ADC circuit of Panasik) a

spread signal. Although a spread signal has lower amplitude level, at the time of the invention it would have been obvious to a person of ordinary skill in the art to use the clipping circuit (taught by Panasik prior to ADC) to protect the ADC from spurious peaks caused by imperfect components and/or interfering signals.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the specifics of block 252 of Fig.11 described in the specification (paragraph [0049] of patent application publication 2005/0083996 of the instant application). Paragraph [0049] (and [0032] which refers to Fig. 1) reads: "The spread spectrum signal 218 can be a direct sequence, a frequency hopped, or a combination of discrete sequence and frequency hopped spread spectrum signal." However it is unclear how such a signal is generated since figures 11, 13, 16 only show a "spread code generator" block. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 17 objected to because of the following informality: Claim 17 recites: "...converting the spread signal...". However, claims 15 and 13 upon which claim 17 depends recite a "spread input signal".

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 5-12, 13-18, 19-25, 26 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding independent claims 1 and 19 these claims recite combining a direct sequence spread spectrum (DS-SS) signal and a frequency hopped spread spectrum (FH-SS) signal to provide a spreading signal. However, the specification, see paragraphs [0032] and [0049]-[0050] (referring to Fig. 11) of the patent application publication 2005/0083996 of the instant application, is unclear on the nature of the DS-SS and FH-SS signals. In the art it is understood that combining DS-SS and FH-SS signals refers to signals generated by spreading an input signal by a spreading code and then frequency hopping the generated spread signal. However, the signal spread code generator 252 of the specification that is a combination of DS-SS and FH-SS signals is used decorrelate an input signal (at a receiver), which implies that the signal 218 corresponds to a spreading signal that was used at the transmitter to spread signal 256. Does the spreading signal obtained by combining a DS-SS and an FH-SS signal corresponds to a frequency hopped spreading code?

Independent Claims 13 and 26, recite producing a spread spectrum (DS-SS) signal. Similarly to claims 1 and 19, a spread spectrum (DS-SS) signal is known in the art to correspond to a (an input) signal that is spread by a spreading code, therefore spreading signal 218 used to correlate with an input signal 254 as shown in Fig. 11 and see paragraphs [0049]--[0050]) is it a spreading code (PN or other spreading code?).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 5-6, 10-12, 19, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310).

With respect to claim 1, Swanke discloses: a spreading code generator that produces a frequency hopped spread spectrum (FH-SS) signal to provide a spreading signal (see Fig. 2 block 208 “spreading synthesizer” and 216 “synchronization circuitry” that supplied CLK and FREQ signals to block 208, column 3, lines 3-5 and column3, line 67 through column 4, lines 1-2,where the frequency-hopped spread injection signal is interpreted to correspond to FH-SS signal); a spreader that combines a the spreading signal with an input signal to provide a spread input signal (Fig. 2, see mixer 206); a signal converter that converts the spread input signal from a first domain to a second domain to provide a converted spread input signal (Fig. 2, see A/D, 214); and a despreader that despreads the converted spread input signal to provide the input signal in the second domain (Fig. 2, mixers 222,222’).

Swanke does not expressly teach: a spreading code generator that produces a direct sequence spread spectrum (DS-SS) signal, and combines the DS-SS and FH-SS signals to provide a spreading signal.

In the same field of endeavor (combination of DS-SS and FH-SS), Tulino discloses: a spreading code generator (Fig. 3, block 308, PN-GEN) that produces a direct sequence spread spectrum (DS-SS) (output of block 304) signal, and combines the DS-SS and FH-SS signals to provide a spreading signal (Fig. 3, block 312, see paragraph [0032])

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke based on the teachings of Tulino so that the spreading code generator that produces a direct sequence spread spectrum (DS-SS) signal, and combines the DS-SS and FH-SS signals to provide a spreading signal, the rationale behind such a modification is that the spread injection signal has PN spreading states (DS-SS signal) combined with frequency hopping since using PN codes to spread signals minimizes fading and interference.

With respect to claim 5, Swanke discloses: further comprising a feedback loop coupling the despreader to the spreader for time aligning the despreading with the spreading (see Fig. 2, block 216 “synchronization circuitry”,column 3, lines 8-14).

With respect to claim 6, Swanke discloses: wherein the first domain is one of a digital domain and an analog domain and the second domain is the other of the digital domain and the analog domain (Fig. 2, first domain is analog domain, and second domain is the digital domain (following the "A/D" operation).

With respect to claim 10, Swanke discloses: wherein at least one of the spreader and the despreader circuit comprises a mixer (Fig. 2, blocks 206 and/or block 222 and 22' mixers).

With respect to claim 11, Swanke discloses: A receiver comprising the system of claim 1 (Fig. 2 of Swanke is a receiver).

With respect to claim 12, Swanke disclose: A transmitter comprising the system of claim 1 (Fig. 2 of Swanke is a receiver in a communication system (which is understood to comprise a transmitter since a receiver is used in conjunction with a transmitter)).

With respect to method claims 19, 21 these claims are rejected based on a rationale similar to the one used to reject apparatus claims 1 and 6 respectively.

8. Claims 7, 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310) and Lampe et. al., (U.S. 5,966,646).

With respect to claim 7, neither Swanke nor Tulino, expressly teach: further comprising a mixer for frequency converting the spread input signal prior to dispreading. In the same field of endeavor (superheterodyne receivers) Lampe et. al.,

disclose: a mixer for frequency converting the input signal (see Fig. 1, mixer 60 and IF signal out of signal 98 the second stage IF, see column 1, lines 50-65, column 3. lines 1-5, 37-41).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, to modify the system of Swanke and Tulino., based on the teachings of Lampe et. al., so that it includes a mixer for frequency converting (to second IF as taught by Lampe et. al.,) the spread input signal prior to dispreading, so that the system of Swanke is implemented as a double-conversion superheterodyne receiver, to provide improved RF image rejection,(Lampe et. al., column 1,lines 50-54)

With respect to method claim 22, claim 22 is rejected based on a rationale similar to the one used to reject apparatus claim 7 above.

With respect to claim 23, Swank discloses: receiving the signal from an antenna (Fig. 2, antenna 202); amplifying the signal (Fig. 2, amplifier 204); neither Swanke nor Tulino expressly teach: filtering the signal, converting the signal to an intermediate frequency signal prior to spreading the signal.

In the same field of endeavor (superheterodyne receivers), Lampe et. al., disclose: filtering the signal (Fig. 1, either filter 22 or 32 “preselector filter”), converting the signal to an intermediate frequency signal (Fig. 1, mixer 26 (or 36) and IF1 signal out of LO 98, see column 1, lines 50-65, and column 3, lines 19-35).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, to modify the system of Swanke and Tulino., based on the teachings of Lampe et. al., to convert the signal to an intermediate frequency (to a first IF as taught by Lampe et. al.,) prior to spreading, so that the system of Swanke is implemented as a double-conversion superheterodyne receiver, to provide improved RF image rejection,(Lampe et. al., column 1,lines 50-54)

9. Claim 8-9, 25, 13-16, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310) and Panasik et. al., (U.S. 2002/0160732).

With respect to claim 8, Swanke et. al., discloses: wherein the signal converter is an analog-to-digital converter (ADC) (Fig. 2, "A/D" converter block 214).

Neither Swanke nor Tulino teach a delta-sigma analog-to-digital converter (ADC). In the same field of endeavor (wireless communications) Panasik et. al., disclose: a delta-sigma analog-to-digital converter (ADC) (see paragraph [0009] an improved sigma-delta ADC and Fig. 2, see first sentence of [0022]).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke and Tulino so that it uses a delta-sigma analog-to-digital converter (ADC) as taught by Panasik et. al., since sigma-delta based ADC are known in the art to provide increased A/D accuracy since sigmadelta based ADC and remove accumulated quantization error.

With respect to claim 9, Swanke discloses: the despreader mitigates degradation and out-of- band (OOB) emissions (column 3, lines 36-45, where the despreading (in conjunction with the spreading) suppresses spurious levels).

Neither Swank nor Tulino expressly teach: a clipping component that reduces peaks associated with the spread input signal.

In the same field of endeavor (wireless communications) Panasik et. al., disclose: a clipping component that reduces peaks associated with an input signal (Fig. 2, clipping circuit 20, see abstract and paragraph [0009]).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke and Tulino based on the teachings of Panasik et. al., so that a clipping component (that is used with the sigma-delta ADC) reduces peaks associated with the spread input signal, so that the spread input signal is maintained within a predefined threshold range when supplied to the ADC, so that overshoot and settling issues (caused by peaks in the input signal that exceed the dynamic range of the ADC) are avoided (Panaski et. al., paragraphs [0006]-[0008])

With respect to method claim 25, claim 25 is rejected based on rationale similar to the one used to reject apparatus claim 9 above.

With respect to claim 13, Swanke dislcoses: a spreading code generator that generates a spread spectrum signal (Fig. 2, block 208, column 3, lines 3-6, the pseudo-random (spread injection) signal); a spreading circuit that receives an input signal and

combines the input signal with the spread spectrum signal to provide a spread input signal (Fig. 2, mixer 206, column 3, lines 5-6); and a despreading circuit that despreads the spread input signal (Fig. 2, mixers 222 and 222' and block 218 column 3, lines 15-21).

Swanke does not expressly teach: a spreading code generator that produces a direct sequence spread spectrum (DS-SS) signal; the spreading circuit receives the input signal and combines the input signal with the DS-SS signal to provide a spread input signal; a clipping component that reduces peaks associated with the spread input signal.

In the same field of endeavor (combination of DS-SS and FH-SS), Tulino discloses: a spreading code generator (Fig. 3, block 308, PN-GEN) that produces a direct sequence spread spectrum (DS-SS) (output of block 304, PN-code is interpreted to correspond to the claimed DS-SS signal) signal, and combines the input signal with the DS-SS signal to provide a spread input signal (Fig. 3, block 304, see paragraph [0032])

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke based on the teachings of Tulino so that the spreading code generator that produces a direct sequence spread spectrum (DS-SS) signal, and combines the input signal with the DS-SS signal to provide a spread input signal , the rationale behind such a modification is to generate a spread input signal (spread injection signal of Swanke) using a DS-SS signal (PN spreading signal) of Tulino, because using PN codes to spread signals minimizes fading and interference.

In the same field of endeavor (wireless communications) Panasik et. al., disclose: a clipping component that reduces peaks associated with an input signal (Fig. 2, clipping circuit 20, see abstract and paragraph [0009]).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke and Tulino based on the teachings of Panasik et. al., so that a clipping component (that is used with the sigma-delta ADC) reduces peaks associated with the spread input signal, so that the spread input signal is maintained within a predefined threshold range when supplied to the ADC, so that overshoot and settling issues (caused by peaks in the input signal that exceed the dynamic range of the ADC) are avoided (Panasik et. al., paragraphs [0006]-[0008])

With respect to claim 14, Swanke discloses: wherein at least one of the spreading circuit and despreading circuit comprises a mixer (see Fig. 2, mixer206 and/or 222 and 222').

With respect to claim 15, Swanke discloses: further comprising a signal converter that converts the spread input signal from a first domain to second domain, the signal converter being one of a digital-to-analog converter (DAC) and an analog-to-digital converter (ADC) (Fig. 2, the ADC block 214).

With respect to claim 16, claim 16 is rejected based on a rationale similar to the one used to reject claim 8 above.

With respect to claim 26, claim 26 is rejected based on a rationale similar to the one used to reject claim 13 above.

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310), Panasik et. al., (U.S. 2002/0160732) and Esterberg et. al., (U.S. 6,873,281)

With respect to claim 17, neither Swanke nor Tulino, Panasik et. al., expressly teach: further comprising a second signal converter for converting the spread signal from the second domain to the first domain,

In the same field of endeavor (sigma-delta modulators) Esterberg discloses: a signal converter for converting a signal from a second domain to a first domain (see Fig. 1, DAC 18 part of a sigma-delta ADC, column 1, lines 16-30). Therefore at the time of the invention, it would have been obvious to a person of ordinary skill in the art that the sigma-delta based ADC of Panasik et. al., used in the system of Swanke et. al., comprises a second signal converter (see DAC inside of the sigma-delta modulator that receives the spread IF signal) for converting the spread signal from the second domain to the first domain (see DAC converter 18 of Fig. 1 of Esterberg as part of the sigma-delta modulator feedback operation).

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310), Panasik et. al., (U.S. 2002/0160732) and Lampe et. al., (U.S. 5,966,646).

With respect to claim 18, neither Swanke nor Tulino, Panasik et. al., disclose: a mixer for frequency converting the spread input signal one of before signal conversion and after signal conversion.

In the same field of endeavor (superheterodyne receivers), Lampe et. al., disclose: a mixer for frequency converting an input signal (Fig. 1, mixer 26 (or 36) and IF1 signal out of LO 98, see column 1, lines 50-65, and column 3, lines 19-35).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, to modify the system of Swanke et. al., based on the teachings of Lampe et. al., to convert the signal to an intermediate frequency (to a first IF as taught by Lampe et. al.,) prior to spreading, so that the system of Swanke is implemented as a double-conversion superheterodyne receiver, to provide improved RF image rejection (Lampe et. al., column 1,lines 50-54).

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swanke (U.S. 5,564,097) in view of Tulino (U.S. 2007/0041310) and Maruyama (U.S. 5,802,101).

With respect to claim 24, neither Swanke nor Tulino expressly teach: converting the signal to a radio transmission frequency; filtering the signal; amplifying the signal; and transmitting the signal over an antenna.

In the same field of endeavor (DS-SS) Maruyama discloses: converting the signal to a radio transmission frequency; filtering the signal; amplifying the signal; and transmitting the signal over an antenna (see Fig. 2, Tx side of system, column 3, lines

46-50). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Swanke and Tulino based on the teachings of Maruyama, the rationale being that the steps taught by Maruyama are essential (necessary) to perform signal transmission over radio frequencies.

13. Claims 1, 6-7 10-12, 19, 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tulino (U.S. 2007/0041310) in view of Park (U.S. 6,289,038) and Maruyama (U.S. 5,802,101).

With respect to claims 1, 6, 7, 10, 11, 12 Tulino discloses: a spreading code generator that produces a direct sequence spread spectrum (DS-SS) signal (Fig. 3, combination of blocks 308, "PN-GEN" and 304 "DS-BPSK", generating signal 310 see paragraph [0032]) and a frequency hopped spread spectrum (FH-SS) signal (Fig. 3, combination of blocks 314 "FH-GEN" and block 312 "FH-MOD" output is a frequency hopped spread spectrum signal); a despreader that despreads the converted spread input signal to provide the input signal. (Fig. 3, block 330, DS-DEMOD paragraph [0040] where it is understood that the spreading code 332 is used to despread the received signal (converted spread input signal) and provide the input signal). Tulino does not expressly teach: a spreading code generator that combines the DS-SS and FH-SS-signals to provide a spreading signal; a spreader that combines the spreading signal with an input signal to provide a spread input signal; a signal converter that converts the spread input signal from a first domain to a second domain to provide a converted spread input signal.

With respect to the limitation: a spreading code generator that combines the DS-SS and FH-SS-signals to provide a spreading signal; a spreader that combines the spreading signal with an input signal to provide a spread input signal. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino so that the spreading code generator combines the DS-SS and FH-SS-signals to provide a spreading signal so that (rationale) the number of components is reduced to produce an equivalent spreading signal;

In the same field of endeavor, Park discloses: a spreader that combines a spreading signal with an input signal to provide a spread input signal (see Fig. 1, spreader, mixer 6 spreading the data sequence with a pn code, column 2, lines 22-25).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino based on the teachings of Park, so that a spreader combines the spreading signal with an input signal to provide a spread input signal, since a spreader (mixer) is used in the art to combine spreading code with data signals and generate a spread spectrum signal that is input to the transmission channel.

In the same field of endeavor (DS-SS) Maruyama teaches: a signal converter that converts the spread input signal from a first domain to a second domain to provide a converted spread input signal (Fig. 2, see blocks 25, 28 receiver side receiving the spread input signal and converting it from a first domain (analog) to a second domain (digital), see column 3, lines 55-67, column 1-3).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino and Park based on the teachings of

Maruyama the rationale behind such a modification is that analog signals (first domain) are transmitted by RF systems (see transmitter disclosed by Tulino on Fig. 3) and digital signals (second domain) are processed by RF systems (antennas receive analog signal that are converted to digital fro processing using DSPs)(see first five lines of paragraph [0032] of Tulino where the components taught by Maruyama are typically used in radio systmes).

With respect to claims 19, 21- 23 method claims 19, 21-23 is rejected based on a rationale similar to the one used to reject apparatus claims 1, 6 (for claim 21), 1 above.

With respect to claim 24, neither Tulino nor Park expressly teach: converting the signal to a radio transmission frequency; filtering the signal; amplifying the signal; and transmitting the signal over an antenna.

In the same field of endeavor (DS-SS) Maruyama discloses: converting the signal to a radio transmission frequency; filtering the signal; amplifying the signal; and transmitting the signal over an antenna (see Fig. 2, Tx side of system, column 3, lines 46-50). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino and Park based on the teachings of Maruyama, the rationale being that the steps taught by Maruyama are essential (necessary) to perform signal transmission over radio frequencies.

14. Claims 8, 13-16, 18, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tulino (U.S. 2007/0041310) in view of Park (U.S. 6,289,038), Maruyama (U.S. 5,802,101) and Panasik et. al., (U.S. 2002/0160732).

With respect to claim 8, neither Tulino nor Park, nor Maruyama expressly teach: wherein the signal converter is one of a delta-sigma analog-to-digital converter (ADC) and a delta-sigma digital-to-analog converter (DAC).

In the same field of endeavor (wireless communications) Panasik et. al., disclose: a delta-sigma analog-to-digital converter (ADC) (see paragraph [0009] an improved sigma-delta ADC and Fig. 2, see first sentence of [0022]).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino et. al., so that it uses a delta-sigma analog-to-digital converter (ADC) as taught by Panasik et. al., since sigma-delta based ADC are known in the art to provide increased A/D accuracy since sigmadelta based ADC and remove accumulated quantization error.

With respect to claims 13, 15-16 claims 13, 15-16 are rejected based on a rationale similar to the one used to reject claims 8 above, and with respect to the limitation: a clipping component that reduces peaks associated with the spread input signal (see that Panasik et. al., teaches clipping (limiting) the signal supplied to the delta-sigma ADC, see paragraph [0009]). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Tulino et. al., based on the teachings of Panasik et. al., so that the spread input signal is maintained

within a predefined threshold range when supplied to the ADC, so that overshoot and settling issues (caused by peaks in the input signal that exceed the dynamic range of the ADC) are avoided (Panasik et. al., paragraphs [0006]-[0008]).

With respect to claims 14 and 18, claims 14 and 18 are rejected based on a rationale similar to the one used to reject claims 10 and 7 respectively.

With respect to claim 26, claim 26 is rejected based on a rationale similar to the one used to reject claim 13 above.

15. Claims 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tulino (U.S. 2007/0041310) in view of Park (U.S. 6,289,038), Maruyama (U.S. 5,802,101), Panasik et. al., (U.S. 2002/0160732).and Esterberg et. al., (U.S. 6,873,281)

With respect to claim 17, Tulino et. al., do not expressly teach: further comprising a second signal converter for converting the spread signal from the second domain to the first domain,

In the same field of endeavor (sigma-delta modulators) Esterberg discloses: a signal converter for converting a signal from a second domain to a first domain (see Fig. 1, DAC 18 part of a sigma-delta ADC, column 1, lines 16-30). Therefore at the time of the invention, it would have been obvious to a person of ordinary skill in the art that the sigma-delta based ADC of Panasik et. al., used in the system of Tulino et. al., comprises a second signal converter (see DAC inside of the sigma-delta modulator that

receives the spread IF signal) for converting the spread signal from the second domain to the first domain (see DAC converter 18 of Fig. 1 of Esterberg as part of the sigma-delta modulator feedback operation).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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11/23/2007

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